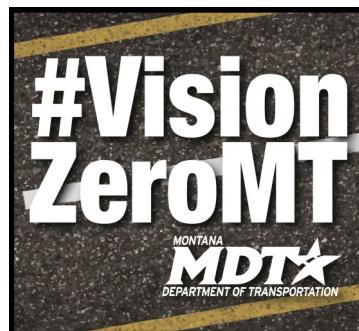


MDT Awards Safety Grants to Support Vision Zero



The Montana Department of Transportation has awarded nearly \$3 million in grants statewide to support Vision Zero, the initiative to eliminate deaths and serious injuries on Montana roads. DUI courts, high visibility enforcement, local buckle-up coalitions, and Native American Safe On All Roads (SOAR) programs are among those

continuing to receive funding. For the first time, a state coordinator for the 24/7 Sobriety Program will be funded. The Montana Highway Patrol requested this position to assist local law enforcement agencies in implementing the program in their communities. For more information, go to <https://dojmt.gov/247-sobriety-program/>.

MDT will also fund increased overtime patrols for law enforcement agencies to focus on enforcement of Montana's impaired driving and seatbelt laws through the Selective Traffic Enforcement Program (STEP). Additionally, MDT will provide grants for law enforcement to purchase equipment such as in-car and body-worn cameras and radar speed signage. MDT administers federal grant monies from the National Highway Traffic Safety Administration.

These funds are used for non-infrastructure activities aimed to address driver behavior. Over the last ten years (2004-2013) impaired driving has been a contributing factor in 35 percent of all serious injuries and 46 percent of all fatalities in traffic crashes in Montana. And 62 percent of all fatalities in automobile crashes were not wearing seatbelts or were wearing the seatbelt improperly.

Funding is limited and awarded through a competitive application process with applications for these funds accepted annually by March 1. Contact Janet Kenny, State Highway Traffic Safety Section Supervisor, at 444-7417 or by e-mail at jakenny@mt.gov.

Enforcement and education along with engineering of roadways and emergency medical response are key in Vision Zero. Working together, Montana can move toward this vision of eliminated deaths and serious injuries on Montana's roads.

The logo consists of the words 'plan2live' in a stylized, lowercase font. The '2' is smaller and positioned between 'plan' and 'live'. The 'a' in 'plan' and the 'l' in 'live' are orange, while the other letters are a darker blue.

Surface Transportation Program Funded Through May 2015



Late Friday, July 31, up against the August break and just the day before FHWA was slated to begin reducing funding reimbursements to states, Congress passed a bill to extend the Surface Transportation Program for eight months and transfer \$10.8 billion to the Highway Trust Fund. The bill was signed by the President on August 8. The extension bill (HR 5021) came after a number of stop-and-start discussions during May and June in both the House and Senate for longer term program authorization and full-year appropriations bills.

Discussions turned to short-term program extensions and trust fund infusions in early July as the projected fund insolvency loomed amid slow progress toward a sustainable program solution.

The eight-month extension allows the program to move forward with no changes to the Moving Ahead for Progress in the 21st Century (MAP-21) structure, which FHWA and states are still working toward implementing. This is good for Montana, as we retain our share of the overall program funding and our program is largely aligned with the performance-based direction of MAP-21.

Moving forward, the extension and infusion of funding allows MDT to continue to plan, develop, and award construction projects; continue to fund public transportation services; and maintain Montana's infrastructure without disruption. However, this is a short-term reprieve for the program, and Congress will have to take up the topics of a long-term reauthorization bill and sustainable revenue source before May 2015. MDT staff will continue to support Montana's congressional delegation in their effort to ensure future funding for Montana's transportation systems.

Construction as Usual, and Then Some

MDT's construction program is planned well into the future. Part of that planning includes being prepared for unplanned, emergency projects. The following are two such projects recently undertaken in the southeastern part of the state, MDT District 5.

Zimmerman Rockfall Mitigation

The Zimmerman Rock fall project was an emergency repair project to reopen Zimmerman Trail. The city of Billings closed the roadway after a spring rock slide damaged the road and guardrail. The road is a heavily traveled route with average daily traffic of 8,550 vehicles and is one of only a few access routes from Billings to Highway 3. Due to the significant impact of the road being closed, the City of Billings worked with MDT to accelerate the delivery of a rock mitigation project. The design was fast-tracked and completed within approximately three weeks. The contract award was accelerated and the notice to proceed was expedited, being issued just a few days after the contract letting. A calendar completion date deadline was utilized to constrain the project completion. Finally, an incentive/disincentive of \$9,000 per day with a maximum incentive of \$63,000 was added to the contract to encourage rapid completion.

The work consisted of removing and stabilizing potential rock fall hazards above the roadway. The loose and unstable rock fragments and blocks were stabilized by scaling, rock bolting, and blasting. The work site was challenging due to the close proximity to residential homes below the highway and city parks and hiking trails below and above the work site.

Arrow Creek Slide Repair

The Arrow Creek Slide Repair project on MT 81 at reference post 47 involved repairing embankment, cut slopes, and drainage damage from flooding in the spring of 2011. The project included replacement of culverts, channel armoring, and slope stabilization. Stabilization included placement of 500 anchor blocks weighing around 22 tons each, restrained with post-tensioned, multi-strand anchors.

MDT programs a small funding reserve to allow staff to act quickly in emergency situations such as this. MDT works to make initial repairs to allow traffic to resume, then moves forward with a permanent repair.



Arrow Creek Slide Repair project included culvert replacement, channel armoring, and slope stabilization.

Draft Public Involvement Plan Open For Review

The MDT Draft Public Involvement Plan is open for public review and comment. This plan documents how MDT will undertake involving the public in planning, programming, project development, and project design in compliance with state and federal regulations. Public input is an important component in shaping the state transportation system, so in addition to meeting legal requirements, MDT's goal is to have a meaningful process to inform the public and solicit input.

The MDT Draft Public Involvement Plan is available for review online at www.mdt.mt.gov/pubinvolv/involveplan.shtml or by contacting Charity Watt at 444-3439, or cwatt@mt.gov. Comments may be submitted in writing to the Rail Transit & Planning Division, MDT, 2960 Prospect Avenue, Helena MT 59620-1001 or online at www.mdt.mt.gov/pubinvolv/involveplan.shtml. Please indicate comments are for project Draft Public Involvement Plan. Deadline for comments is 5 p.m., October 29, 2014.

MDT attempts to provide accommodations for any known disability that may interfere with a person's participation in any service, program or activity of our department. If you require reasonable accommodations to participate, please contact Charity Watt at 444-3439. For the hearing impaired, the TTY number is 444-7696 or 1-800-335-7592, or call Montana Relay at 711. Alternative accessible formats of this information will be provided upon request.

Montana Joins the Ranks of States With Traffic Noise Barriers

Traveling US 93 Bypass in Kalispell, one will see a noise barrier that was installed on the segment between Airport Road and Foys Lake Road. The wall is approximately 12 to 16 feet high, made of pre-cast concrete panels, and has a mountain design on the highway side. Behind the barrier is a bike path and residences. This is the first barrier of this type that MDT has constructed, and while it was a design and construction challenge, the end result offers noise reduction of seven to ten decibel for residents and bike path users.

Noise barriers are new to Montana and it is no small feat to see one come to completion. Where a new road is constructed on a new alignment through residential areas, noise barriers can be valuable. In addition, projects that involve adding through-travel lanes or revamping interchanges may qualify for noise abatement, especially if concentrated residential areas are in the vicinity.

Before a noise barrier can be constructed, MDT must get buy-in from a majority of affected residents and homeowners. Noise barriers are generally well supported. Surveys show that residents will sacrifice view for a reduction in noise. Barriers can provide a reduction in noise, but not elimination of noise.

Other areas of Montana where noise barriers are being considered include I-90 in Missoula near the Van Buren exit, along I-15 near the Cedar Street Interchange in Helena, and along the Kalispell Bypass north of Three Mile Drive.

For more information, contact Cora Helm at 444-7659 or cohelm@mt.gov.

SAVE THE DATE — OCTOBER 15 - 16

Statewide Transportation Safety Summit

The Gateway Center, 1710 National Avenue, in Helena

October 15

Montana Comprehensive Highway Safety Plan Update

Confirm emphasis areas, discuss safety goals and determine safety performance measures, and identify strategies.

October 16

Safety Grant Program Management Workshop and Media College

Recipients of NHTSA grants and anyone interested in this funding should attend to discuss the program, grant criteria and reporting procedures. The Media College includes best practices for media planning and buying, plus PR tools.



RSVP to
Pam Langve-Davis at
406.444.7646 or
plangvedavis@mt.gov
TTY: 406.444.7696

Montana Comprehensive Highway Safety Plan
mdt.mt.gov/safety/chsp-update/default.shtml

International Walk and Bike to School Days

Summer may be over, but as long as the weather holds, many of Montana's children walk or bike to school every day. Drivers are reminded to share the road, use caution and look for cyclists and pedestrians especially near schools and in school zones.

On October 8, numerous students, parents, and volunteers are expected to walk, bicycle, and roll to school to celebrate International Walk to School Day, an annual event that is celebrated in more than 40 countries worldwide.

International Walk to School Day is an event focused on encouraging children to walk to school. The impact this event can have on a community can be widespread. When children form the habit of walking or biking to school they are building a healthy transportation habit that may increase later in their adulthood. In addition, replacing car trips to school with walking or bicycling can reduce congestion and air-polluting emissions. Reducing traffic congestion, boosting a sense of community, and improving neighborhood connections provide a valuable benefit to communities.

It is imperative that all drivers are aware and watch for cyclists and pedestrians, not only during Walk to School Day, but all year long.

Bike to School Day, which occurs every spring, is scheduled for May 6, 2015.

For more information about these events and resources, or to plan and register your local community's event, please visit:

<http://www.walkbiketoschool.org/ready/about-the-events/walk-to-school-day> or contact Angie Zanin at azanin@mt.gov or 444-9273.

Is that a Deer on the Road?

Fall is a beautiful and active time of the year in Montana, but it can present challenges to drivers. One of those challenges is increased wildlife activity on or near roadways. With that in mind, MDT reminds motorists to use extra caution and stay alert when driving this fall to avoid animal-vehicle collisions. MDT offers the following tips, courtesy of AAA:

- Keep your eyes moving. Continually sweep your eyes across the road in front of you for signs of animals and movement. Animals may also be alongside the road. While the most likely accident is you hitting an animal, on occasion, they might hit you by running into the side of your car.
- Be especially attentive in early morning and evening. Many animals, especially deer, are most active during these times, roughly 5 to 8 a.m. and 5 to 8 p.m., which include prime commuting times for most people.
- Use high beams when there is no oncoming traffic. You can spot animals sooner. Sometimes the light reflecting off their eyes will reveal their location.
- Slow down and watch for other wildlife to appear. Deer and other wildlife rarely travel alone, so if you see one, there are likely to be one or several more.
- Slow down around curves. Animals are harder to see in advance when going around curves.
- One long blast. A long blast on your horn may frighten large animals, like deer, away from your vehicle.
- Use brakes if an impact is imminent. Don't swerve. Instead, stay in your lane. Swerving away from animals can confuse them so they do not know which way to run. It can also put you in the path of oncoming vehicles or cause you to crash into something on the side of the road like a light post or a tree.
- Always wear a seatbelt. The chances of getting injured when hitting an animal are much higher if you do not have your seatbelt on. Also never drive impaired, distracted, or drowsy.
- Don't go near or touch a wounded animal. A frightened and wounded animal can be unpredictable and cause injury. For help, and to report a collision, call the city police, county sheriff, or the Montana Highway Patrol, depending on where the crash occurs.

MDT Completes Veteran's Bridge NE of Livingston

Travelers in the Livingston area can now take advantage of a new bridge on route US 89 over the Yellowstone River. MDT recognized the importance of this project to the community and helped form the Yellowstone Bridge Advisory Committee (YBAC) during the Environmental Assessment (EA) process. The YBAC represented a broad spectrum of stakeholders including local officials, city and county staff, and representatives of local and regional organizations. This group was vital in helping identify key community issues. Many of the new structure's functional and aesthetic attributes are a direct result of the collaboration between MDT and the advisory committee.

Then

In the 1930's, when the structure was built, a Montana newspaper titled the bridge the "Yellowstone River Bridge". Later, it was referred to locally as the "KPRK Bridge", owing to its proximity to the KPRK radio station.

MDT initiated the bridge replacement project in 2002. The old structure was categorized as functionally obsolete because it was considered too narrow for its intended use. The bridge allowed for only two, 11-foot wide travel lanes and no shoulders. Sideswipe-opposite direction crashes occurred on the bridge and the potential for these types of crashes increased when Interstate 90 near Livingston was closed due to high wind events and interstate traffic was detoured through the project area. The narrow bridge provided no space for pedestrians and bicyclists to safely traverse the 500-foot long bridge. Also, the structure was supported by a two-girder system that put it in the category of fracture critical, meaning that the entire structure could fail if one girder failed.

River floaters also encountered safety issues. The bridge foundation consisted of four flared rectangular pier walls that were skewed 20 degrees from the bridge alignment. The piers were properly aligned with the river when the structure was built in 1934; however, the river approach angle changed over time and during flood events. A bend in the river just upstream of the bridge left floaters with little time to set up as they approached the roadway and railroad bridges. The bend, along with the skewed pier walls and strong current, contributed to accidents each year in which floaters hit one of the piers and were upended and trapped. The skewed pier walls were also susceptible to scour, as well as debris and ice accumulation.

Now

The new bridge is a four-span, steel girder structure that has two, 12-foot wide lanes, two 8-foot wide shoulders and a separated 10-foot wide multiuse path that allows pedestrians and bicyclists to cross the bridge safely.

To optimize hydraulic performance and safety for floaters,

single drilled shaft piers were chosen for the bridge supports. These piers are cylindrical and can accommodate changes in the river approach directions, which helps minimize long term impacts to the river. The new bridge is 140 feet longer than the old one; but has one less pier for floaters to navigate around and one less pier to impact the river.

Additional Features:

MDT constructed a parking area that connects to the multiuse path on the bridge and to a path leading to the river. Under the bridge, there is now room for recreationists to enjoy the river. Because aesthetics of the bridge were a major concern of residents, the shape, size, color and texture of the components were given close attention throughout the design process. For example, the texture used on the retaining walls was a cut stone style and colored to replicate travertine which played a large role in the historical economy of Livingston. Other aesthetic features are reflected in the finished product.

Project Development and Construction

The project design team identified and processed several constraints during project development. A volatile organic compound ground water plume from the Burlington Northern Livingston Shop (a Complex Montana State Superfund Site) extends throughout the project area. This required extensive coordination between MDT and the Montana Department of Environmental Quality to ensure the project flowed smoothly from the initial geotechnical investigation during design through the drilled shaft installation and old pier removal during construction.

Montana Fish Wildlife and Parks (FWP) required deep removal of the old intermediate piers, and initially opposed allowing controlled blasting for demolition. MDT performed a feasibility study of several demolition options to identify a method to meet stakeholders' needs and satisfy project constraints. Blasting was deemed the most practical and likely method for removal. MDT coordinated with FWP on a blasting specification, and the controlled blasting helped successfully remove the piers. FWP is now more open to controlled blasting for pier removal projects.

A single drilled shaft pier foundation did not allow for the bridge to be built in phases. This limitation, along with tight space requirements at the site and scour concerns for the downstream railroad bridge, led MDT to close the existing bridge during construction and detour traffic via I-90. Timing the bridge closure to meet the natural constraints of the site and cause the least disruption to travelers proved difficult. High winds typically occur October through March, often causing closures of I-90 and traffic detours through the project area. High water on the Yellowstone River occurs around the end of April through June, and work within the river channel during high water periods is not permitted by the resource agencies. MDT realized these challenges meant special attention needed to be paid to contract time. The new drilled shafts were constructed adjacent to the old structure while it was still open to traffic. This cut approximately



Yellowstone River Bridge (now Veteran's Bridge) shows 'then' on the left and 'now' on right.

five months off the anticipated down time affecting road users. Timing the project for a fall contract letting and allowing the contractor to work through the winter provided time to order steel girders, secure permits and install the drilled shafts when the river was low. The old structure was removed before high water. To help ensure these milestones were met and detour time was reduced, an incentive/disincentive clause was added to the contract.

MDT also adjusted the project schedule to construct the new bridge prior to the opening of a new hospital on the east side of the river. Coordination and cooperation between MDT, the City of Livingston and Livingston Healthcare during design and construction accommodated utilities installation beneath the new structure and throughout the project area.

Detailed planning during the development phase and diligent work during construction allowed the project to be open to traffic after eight months of construction time—two months earlier than anticipated. Closing the bridge to traffic provided a safer work environment for the contractor and allowed the job to be completed faster. In addition to the overall success of the project, the new bridge was dedicated as “Veteran’s Bridge” in August 2013 and serves as an example of successful cooperation between MDT and the communities we serve.



Veteran's Bridge NE of Livingston, then.



Veteran's Bridge NE of Livingston, now.

Montana Announces Two Corridor Studies

MDT initiated two new corridor studies: Bridger Canyon and I-15 Gore Hill to Emerson Junction, in partnership with FHWA and local authorities. The studies have an approximate time line of one year and are expected to conclude in early summer of 2015.

MDT’s corridor-planning process was established to bridge the gap between its statewide long-range transportation policy plan and project-level environmental requirements. Corridor studies are planning-level evaluations of a specific area and are not design, maintenance, or construction projects. Depending on need and funding availability, improvement options may be forwarded from a study and developed into projects at a later date. The corridor planning process involves early communication with interested agencies and the public to help identify needs, constraints, and improvement options given available resources and local support.

Bridger Canyon Corridor Study

The study area includes Primary Route 86, beginning at its intersection with Story Mill Road and extending northeasterly to its intersection with US 89. This study will identify short- and long-term improvements that meet the needs and objectives developed for the corridor. The first informational meeting for the Bridger Canyon corridor study will be held in mid-October. For a study area map, schedule, and additional information visit the study website at <http://www.mdt.mt.gov/pubinvolv/bridger/>.

I-15 Corridor Study

The 2014 Great Falls Area Long Range Transportation Plan (LRTP) identified the need for an Interstate study in the Great Falls area. The study area includes I-15 through Great Falls, beginning southwest of the Gore Hill Interchange and ending northwest of Emerson Junction. Also included in the study is I-315 and 10th Avenue South, west of the Missouri River. The study will include analysis of capacity, safety, and operational concerns within the study area. The first informational meeting for this study is scheduled for early October. For a study area map, schedule, and additional information visit the study website at <http://mdt.mt.gov/pubinvolv/i15/default.shtml>.

New Greycliff Rest Area Hailed as “State of the Art”

Less than a year after opening, MDT’s new rest area at Greycliff is considered among the best of its kind by the traveling public. The energy efficient building has a heat recovery ventilator, which results in significant energy use reduction, in-floor heat, and a surveillance security system.

Observations left in the rest area’s comment box are consistently and overwhelmingly positive, with users from across the United States and Canada indicating it is “*much better than other rest areas they have used*” and “*This rest area is cleaner than rest areas in other states.*” A traveler from Billings, states, “*Thank you for fixing this rest area!!*” Another traveler from Grandview, Washington, wrote, “*I cannot think of a thing the rest area needs. All of my needs were met, even being on a motorcycle in 90 degree heat.*” Other users have commented, “*The individual restrooms are good.*” Also, people have had a very positive reaction to the pet facilities, with one user stating they are “*awesome.*”

Diamond Construction, Dowl HKM, and Bjerke Architects helped make the new Greycliff rest area a success. TJ Ramaeker, MDT’s project manager, coordinated the construction of this innovative rest area, which was completed ahead of schedule in December 2013.



New Greycliff rest area.

2014 Research Projects

During the May Research Review Committee (RRC) meeting, 13 new research topics were approved to move forward to technical panels for further development. The technical panel for each project will determine the need for research. If the need for research is confirmed, the technical panel will develop a scope-of-work and follow the project through the conduct of research and implementation. The 2014 research topics include the following:

Montana Airport Economic Impact Update

This research would update the 2007/2008 study and provide MDT and local governments the information to assist in capital improvement, master, and airport layout planning to meet future needs of community airports.

In-Depth Assessment of Montana Road Weather Information System

MDT has 72 Road Weather Information System (RWIS) stations throughout the state. These stations are fixed and other entities (e.g., National Weather Service) currently rely on these stations for information. A comprehensive review and assessment is needed to ensure the efficient use of weather data in various transportation applications and the optimum use of MDT resources.

Development of Strategic Enterprise Architecture Design for MDT

The purpose is to develop a strategic enterprise architecture plan for MDT. The objective is to inform and guide technology decisions for the enterprise and ensure technology decisions align with MDT business objectives. A critical element will be development of an implementation plan and timeline. The plan must be executable so that MDT can implement through a series of follow-up projects.

Statewide Land Mobile Radio (LMR) Propagation Analysis and Modeling Along Major Highway Network

As of January 2013, all LMR had to be narrow band; this conversion from wide band to narrow band has created gaps in the LMR coverage. The research will enable MDT to determine the deficiencies in the current LMR communication system and use study findings for future improvements.

Advanced Methodology to Determine Highway Construction Cost Index (HCCI)

This research will develop an advanced methodology to determine HCCI and a methodology to forecast it. HCCI is a quick indicator of highway construction cost changes over time and is typically used for conceptual cost estimation for project budgeting purposes.

Advanced Method to Detect Unbalanced Bidding Patterns Using Historical Bid Data and Daily Work Report (DWR) Data

This study will analyze the historical bid and DWR data together to locate patterns to allow MDT to detect unbalanced bidding in future bids.

Top-down Construction Cost Estimating Model/Guide Using a Neural Network within an Off-the-Shelf Spreadsheet and Database Programs

The proposed project is a top down estimating tool for preliminary cost estimating for construction projects such as during the district nominating or PFR process. The neural network is a dynamic data-

base that works by identifying/recognizing patterns of multiple parameters (i.e. project length, width, type, location). It is the same type of program used in finger print and facial recognition programs.

Assessing Noise Levels and Impacts from Pile Driving on Bull Trout During MDT Project Construction

New requirements from the U.S. Fish and Wildlife Service based on noise-produced impacts to bull trout are expected to add additional workloads and cause potential delays to projects. This research will investigate noise levels created from pile driving and potential effects on bull trout during projects in western Montana in an effort to reduce the impact of these new requirements.

Evaluation of Jump-out Designs in a Controlled Setting and Along US Highway 93 N

This research involves testing different jump-out heights and other design parameters for white-tailed deer using both field tests and conducting tests in a controlled environment.

MDT Wildlife Crossing Guidelines

Wildlife crossings and associated features are proven mitigation measures to increase public safety, and maintain or create habitat connectivity. The development of MDT Wildlife Crossings Guidelines will assist in determining the appropriateness of including wildlife crossings and/or exclusionary devices on proposed projects based on standardized criteria.

Development of a New Specification for 3/4-inch Crushed Base Course, Type A

Crushed base courses are typically a cost-effective component to pavements that reduce the amount of asphalt pavement needed for a road. For some projects, however, obtaining the material that meets the current specifications for 5A or 6A crushed base course is not economical, especially in eastern Montana. If adequate performance can be met with a 3/4-inch crushed base course, then including a specification for this new base course will ensure Montana's transportation system continues to be cost effective.

Feasibility of Non-Proprietary Ultra-High Performance Concrete (UHPC) for Use in Highway Bridges in Montana

The objective of the proposed project is to design and test non-proprietary UHPC mixes to determine whether UHPC is a viable option for Montana bridge decks.

Large-Scale Laboratory Testing of Geosynthetics in Roadway Applications

The objective is to establish a laboratory testing program for geosynthetics in roadway applications to better characterize their behavior and performance characteristics in Montana.

Additional research projects initiated include the following:

Disparity/Availability

The purpose of this project is to determine to what extent disadvantaged businesses are available and participate in the procurement of federally funded contracts within Montana. This project will update that study.

continued on page 7

Flying by Night: The MacDonald Pass Airway Beacon

By Jon Axline, MDT Historian



Airway beacon in Powell County on MacDonald Pass.

For 80 years, airplane pilots have relied on a chain of lighted airway beacons to steer their way across western Montana at night. Montana's beacons are the remnants of a once transcontinental system that guided commercial and private pilots across the United States since 1934.

Although the Federal Aviation Administration (FAA) had largely abandoned the beacon system by 1972 as modern navigational aids made them obsolete, the Montana Aeronautics Division still operates and maintains 17 beacons, making Montana the last state that still uses the beacons to guide pilots.

A prior MDT director attempted to turn the beacons off. However, Montana private pilots complained about the decision and the director had them relit. One of those beacons still lights the way over MacDonald Pass, towering above a Forest Service campground named for the first person to fly a plane over the Continental Divide, Cromwell Dixon. The MacDonald Pass beacon was recently listed in the National Register of Historic Places in recognition of its contribution and significance to the aviation history of Montana.

The US Army and the Post Office Department were the first federal agencies to experiment with lighted airway beacons in the early 1920s. In 1926, the US Department of Commerce's newly created Bureau of Air Commerce began designating airway corridors for transcontinental air mail and commercial pilots. Between 1926 and 1938, the bureau created 18,000 miles of national airway corridors and installed 1,550 lighted beacons to mark the corridor for night flying. The bureau designated the Northern Transcontinental Airway corridor between Minneapolis and Seattle in 1934 and began constructing beacons along its length shortly afterwards. In Montana, the corridor consisted of 84 beacons, intermediate landing fields every 50 miles, and airports at Miles City, Billings, Bozeman, Helena, and Missoula. Beacons eventually stretched across Montana from Miles City to Lookout Pass on the Northern Transcontinental route and from Monida Pass to Great Falls on the National Parks Airway.

The last beacon to be switched on in the Northern Transcontinental Airway was at MacDonald Pass on November 10, 1935. The completion of the beacon system across Montana was cause for celebration in Helena. As the beacon flashed in the distance on the Continental Divide, an estimated 4,000 people braved frigid weather and attended an event at Helena Municipal Airport to celebrate. The *Helena Independent* called the celebration the "Hanging of the Golden Lantern marking the inauguration of the night flight of the Northwest Airlines

following completion of the beacon system from the Twin Cities to the coast." For nearly nine decades, the beacon has faithfully stood sentinel at the crest of the Continental Divide, safely directing private and commercial pilots over the mountains in all kinds of weather.

The MacDonald Pass beacon is typical of the airway beacons constructed between 1934 and 1945. It consists of a 91-foot tower crowned by a steel platform upon which the rotating beacon sits under a Lexan dome (Lexan replaced the original glass in the dome a few years ago). In 1931, the US Patent Office granted John Bartow a patent for a new type of rotating beacon which emitted one candle power every 1/10th of a second that could easily be seen over the rugged terrain of the Rocky Mountains. The beacon itself consists of a 24-inch reflector amplified by three lenses. The design made the beacon light distinguishable from other lights over a much wider range than previous signals. The beacon also included red and green directional lights that corresponded with the air route; the red course lights flashed a Morse code signal identifying the beacon to pilots. The Bartow beacon rotated at six rpm's and included a spare light bulb in case one should burn out. The bulb reportedly could be automatically placed in position within a few seconds of the primary bulb's failure. A shack adjacent to the tower housed a self-starting gasoline-powered generator that originally provided the electricity to the beacon. In 1942, the Montana Power Company hooked the beacon up to a newly installed power line that crossed the pass. The beacon required only minimal maintenance by a Civil Air Administration "mechanician" who regularly visited the site, even in subzero weather, to ensure everything worked properly.

The 17 beacons under the Montana Aeronautics Division's administration are currently maintained by Mike Rogan and Ken Wilhelm, who, like their predecessors, are responsible for ensuring the continued operation of Montana's historic airway beacons.

Check out the *Wall Street Journal* article about the maintenance of these airway beacons at:

<http://online.wsj.com/articles/montana-pilots-love-their-beacons-but-lighting-them-isnt-for-the-faint-of-heart-1410316202>

2014 Research Projects continued from page 6

Rockfall Hazard Classification and Mitigation System

In the initial study for this project, MDT sought to develop and implement a comprehensive rockfall management system for use on the department's state-maintained roadways. MDT is now looking to update the study.

Information on these projects as they progress can be found on each project's web page or MDT's Research Programs *What's New* web page at <http://www.mdt.mt.gov/research/whatsnew.shtml>.

5260 copies of this public document were published at an estimated cost of \$0.46 per copy for a total of \$2434 which includes \$594 for printing and \$1840 for distribution.

MDT's mission is to serve the public by providing a transportation system and services that emphasize quality, safety, cost effectiveness, economic vitality, and sensitivity to the environment.

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MDT Wants Your Comments

To receive a list of highway projects MDT plans to present to the Transportation Commission, visit http://www.mdt.mt.gov/pubinvolv/docs/trans_comm/proposed_proj.pdf, or give us a call at 1-800-714-7296. You can mail your comments on proposed projects to MDT at the following address or e-mail them to mdtnewprojects@mt.gov.

MDT Project Analysis Manager
PO Box 201001
Helena, MT 59620-1001

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Contact Information

Only the most frequently requested numbers are listed here. For an area or person not listed, call 800-714-7296 (in Montana only) or 406-444-3423. The TTY number is 406-444-7696 or 800-335-7592.

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